

STATE OF INDIANA)
)
COUNTY OF MARION)

SS: BEFORE THE INDIANA DEPARTMENT
 OF ENVIRONMENTAL MANAGEMENT

COMMISSIONER OF THE)
DEPARTMENT OF)
ENVIRONMENTAL MANAGEMENT,)

Complainant,

v.

USX CORPORATION,
(U.S. STEEL GROUP)

Respondent.

) Cause No. A-960
) Cause No. A-1455
) Cause No. A-1518
) Cause No. A-1670
) Cause No. A-1729
) Cause No. A-2332
) Cause No. A-2427
) Cause No. A-2461
) Cause No. A-2462
) Cause No. A-2467
) Cause No. A-2468
) Cause No. A-2469
) Cause No. A-2470
) Cause No. A-2471
) Cause No. A-2526
) Cause No. A-2527
) Cause No. A-2537
) Cause No. A-2570
) Cause No. A-2585
) Cause No. A-2623
) Cause No. A-2624
) Cause No. A-2721
) Cause No. A-2724
) Cause No. A-2745
) Cause No. A-2746
) Cause No. A-2797
) Cause No. A-2798
) Cause No. A-2802
) Cause No. A-2847

AGREED ORDER

The Commissioner and the Respondent desire to settle and compromise this action without hearing or adjudication of any issue of fact or law and hereby consent to the entry of the following Findings of Fact and Order. The execution of this Order by Respondent is not an admission of any violation of or liability for any allegations or issues addressed by this Order.

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USX CORPORATION
(U.S. STEEL GROUP)

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John H. Goodish
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Gary Works

Date: 3/15/96

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Date: 3/15/96

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Date: 3/18/96

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Vice President - Operations
U.S. Steel Group

Date: 3/18/96

By: Charles C. Gedeon
Charles C. Gedeon
Executive Vice President - Raw Materials
U.S. Steel Group

Date: March 15, 1996

TECHNICAL RECOMMENDATION
Department of Environmental Management

By: David F. Valinetz
David F. Valinetz, Chief
Air Section
Office of Enforcement

Date: 3-21-96

COUNSEL FOR COMPLAINANT
Department of Environmental Management

By: Kathryn A. Watson
Kathryn A. Watson
Attorney at Law

Date: 3/22/96

By: William G. Divine
William G. Divine
Office of Legal Counsel

Date: 3-22-96

Approved and adopted by the INDIANA DEPARTMENT OF ENVIRONMENTAL
MANAGEMENT this 22 day of March, 1996.

Kathy Prosser
Kathy Prosser
Commissioner

EXHIBIT E

U. S. STEEL GROUP

GARY WORKS

SUPPLEMENTAL ENVIRONMENTAL PROJECTS

**U. S. STEEL GROUP - GARY WORKS
SUPPLEMENTAL ENVIRONMENTAL PROJECTS**

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**U. S. STEEL GROUP - GARY WORKS
SUPPLEMENTAL ENVIRONMENTAL PROJECT**

CLEAN WATER COKE QUENCH PROJECT

Process Description

The Clean Water Coke Quench Project is defined, for the purposes of this Agreed Order and this Exhibit, to be the construction of a Coke Plant Process Water Treatment Plant as further described specifically herein. The Coke Plant Process Water Treatment Plant process flow diagram is included at the end of this section.

The process water will first be routed through two oil/tar separation tanks (normally operated in series) for the removal of any residual light oil or tar. The light oils will be skimmed from the tank surfaces and the heavy tars will be pumped off of the tank bottoms. Both the light oils and the heavy tars recovered will be sent back to the by-products recovery system via decanters for processing. The process water will then be pumped (on level control) to either one of two equalization tanks for chemical and hydraulic dampening. These equalization tanks will provide two (2) days of retention time at a normal operating level of fifty percent (50%) of the total tank volume, and an additional two (2) days of storage if one hundred percent (100%) of the total tank volume is utilized.

The normal flow from the equalization tanks will be pretreated through a free ammonia still. The still will use steam to heat the water and separate free ammonia, benzene and acid gasses from the water. These gasses will be recycled to the primary coolers and mixed with the coke oven gas to be processed through the by-products recovery system. The normal flow of the pretreated free ammonia still bottom water will be to the biotreatment plant equalization tank, where provisions will be made to add groundwater in the future. This tank will provide approximately eight (8) to twelve (12) hours of hydraulic retention time before the biotreatment plant. During periods of downstream process interruptions, such as flow upsets, power failures, pH upsets or thermal upsets, the plant operator will have the option of pumping the pretreated water to the one million (1,000,000) gallon Emergency Storage Tank, which will provide a maximum of two (2) days of retention time, sending the pretreated water to the coke quench system or a combination of both options. The quantity of pretreated water that will be sent to the coke quench system will be determined by the level in the Emergency Storage Tank. The maximum proportion of pretreated water in the make-up water that is supplied to the coke quench system will be approximately fifty percent (50%). This is summarized in Table No. 7 in this section.

The biotreatment plant will use an innovative Integral Activated Sludge System (IASS) consisting of two (2) two million one hundred and forty thousand (2,140,000) gallon tanks operated in parallel, each with an anoxic zone for nitrate and organics removal, an aerobic zone for organics polishing and nitrification and an integral clarifier system for solids separation. The anoxic zone will be mixed by recycling mixed liquor from the aeration basin. The aerobic zone will be mixed by a subsurface diffused air system. Dilution water will be added to the IASS for conductivity, toxicity and temperature control. The treated effluent from the overflow of the integral clarifier, which will comply with applicable BAT limits, will be discharged to the Grand Calumet River. The nonhazardous biosolids generated by the process will be dewatered prior to either being recycled to the coal feed for the coke batteries or trucked to a landfill.

In addition to the major processes, facilities will be constructed for adding the following chemicals:

- polymers in the oil and tar removal systems and the biotreatment plant for enhancing solids separation;
- antifoam in the still and biotreatment plant for foam control;
- phosphoric acid for nutrient addition in the biotreatment plant;
- magnesium hydroxide, caustic soda or soda ash for alkali addition in the biotreatment plant;
- powdered activated carbon for organic removal enhancement in the biotreatment plant (optional); and
- an organic carbon source for supplemental nitrate removal (optional).

Quantification of Environmental Benefit

Gary Works currently supplies the coke quench system with make-up water consisting of approximately fifty percent (50%) coke plant process water and fifty percent (50%) Lake Michigan quality water. Gary Works could have installed an air stripper to reduce emissions of benzene only by stripping benzene out of the process water, but instead decided to install a process water treatment plant, which will result in the ability to supply the coke quench system with one hundred percent (100%) Lake Michigan quality make-up water.

It is estimated that the Clean Water Coke Quench Project will achieve a ninety-nine percent (99%) reduction of ammonia emissions, a ninety-seven percent (97%) reduction of VOC emissions, including benzene, total CN, phenolics and others and a thirty-eight percent (38%) reduction of PM₁₀ emissions annually from coke quenching. The estimates of annual emissions reductions assume that it may be necessary to send to the coke quench system the equivalent of five (5) days of pretreated water per year. The maximum proportion of pretreated water in the make-up water that is supplied to the coke quench system will be approximately fifty percent (50%). The present and future coke quench emissions are shown in Table No. 6 in this section.

Estimated Project Value

The estimated total project cost for the Clean Water Coke Quench Project is \$37,850,000.00. The estimated annual operating and maintenance cost is \$4,200,000.00. The estimated total project cost for an air stripper facility to remove benzene only is \$1,000,000.00. These costs are summarized in Table No. 8 in this section.

The total value of the Clean Water Coke Quench SEP is \$37,850,000.00 less the cost associated with reducing benzene emissions of \$1,000,000.00, or \$36,850,000.00.

Project Schedule

The Clean Water Coke Quench Project Schedule included in this section includes milestone dates for construction engineering, equipment procurement, construction, manning selection and training, and start-up and commissioning. These milestone dates shall run from the date of issuance of a NPDES permit for the discharge of treated water from the biological treatment plant to the Grand Calumet River.

**U. S. Steel Group
Gary Works**

**Supplemental Environmental Projects
Estimates of Emissions Reductions**

**Clean Water Coke Quench Project
Table No. 6**

	Current Emissions		Future Emissions		Net Emissions Reduction		
	Air lb/yr	Water lb/yr	Air lb/yr	Water lb/yr	Air lb/yr	Water lb/yr	Total lb/yr
Media Units							
PM ₁₀	177,040	N/A	110,080	N/A	66,960	N/A	66,960
SO ₂	TBD	N/A	TBD	N/A	TBD	N/A	TBD
VOC	725,726	N/A	18,836	N/A	706,890	N/A	706,890
NH ₃ -N	3,826,692	0	39,827	21,900	3,786,865	(21,900)	3,764,965
Benzene	17,425	0	9	365	17,416	(365)	17,051
Total CN	72,059	0	16,774	7,300	55,285	(7,300)	47,985
Phenolics	520,083	0	10,754	128	509,329	(128)	509,201

Note:

- 1) Future emissions estimates account for the equivalent of five days per year of coke quenching with pretreated water.
- 2) The only solid waste that will be discharged from this process is nonhazardous biosolids, which is planned to be recycled to the coal feed for the coke batteries.

**Pretreated Water to Coke Quench
System During Process Upsets
Table No. 7**

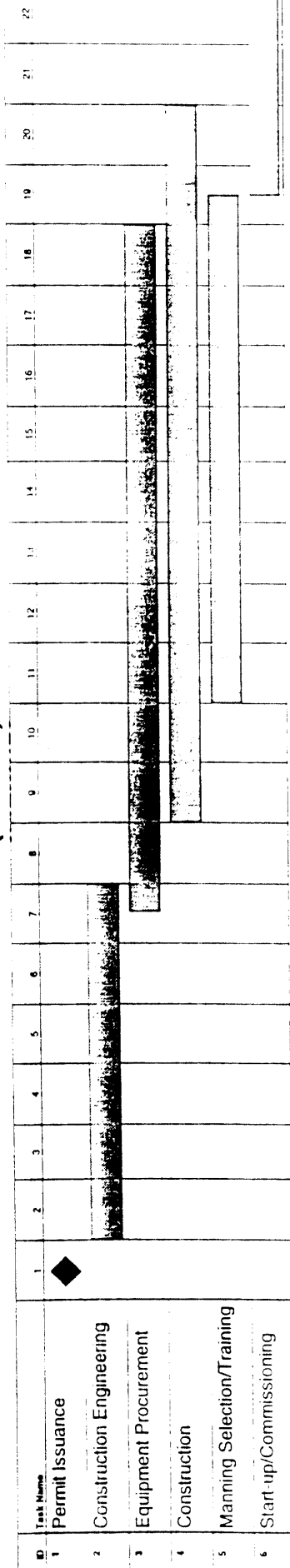
Emergency Storage Tank Level (% Full)	Proportion Pretreated Water sent to Quench	Proportion Pret. Water in Quench Make-up
50.0%	25.0%	12.5%
60.0%	50.0%	25.0%
70.0%	75.0%	37.5%
80.0%	100.0%	50.0%

**U. S. STEEL GROUP - GARY WORKS
SUPPLEMENTAL ENVIRONMENTAL PROJECT**

**CLEAN WATER COKE QUENCH PROJECT
ESTIMATED PROJECT VALUE BREAKDOWN
TABLE NO. 8**

ITEM NO.	DESCRIPTION	COST
1	Preliminary Engineering	\$ 900,000
2	Bench Scale Treatability	\$ 250,000
3	On-site Pilot Plant	\$ 250,000
4	Construction Engineering	\$ 2,000,000
5	Major Equipment & Installation	\$ 33,150,000
6	Training and Start-up	\$ 1,300,000
Total Project Cost		\$ 37,850,000
Less Benzene Air Stripper Project Cost		\$ 1,000,000
Total Project Value		\$ 36,850,000
Annual Operating & Maintenance Costs		\$ 4,200,000

U.S. Steel Group - Gary Works Clean Water Coke Quench Project Schedule (Months)



Task

Measure

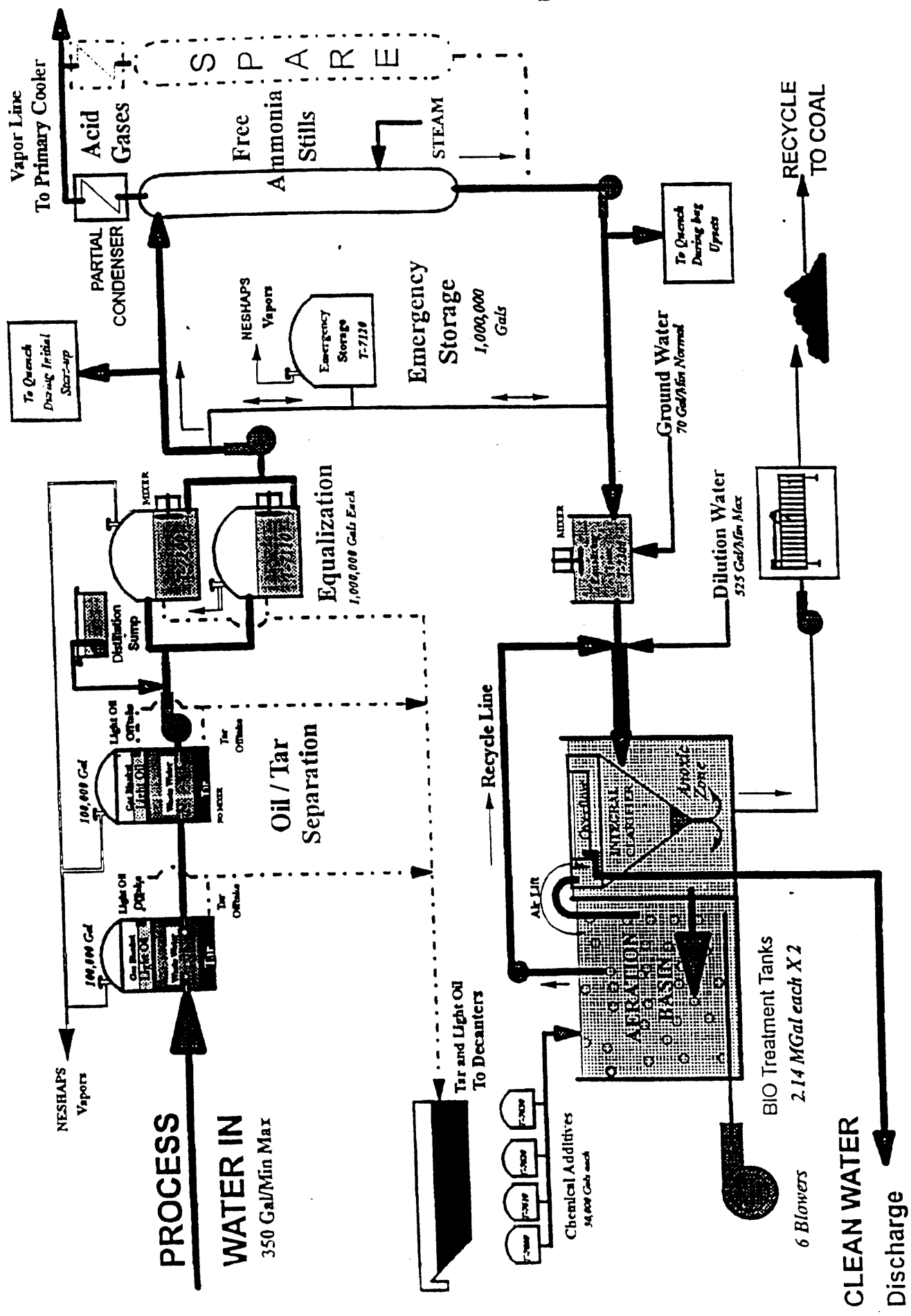
Roll Up Task

Roll Up Progress



Measure
Summary

Task
Progress



Gary Coke Process Water Treatment Plant